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Drive Through the Ages



Reserve
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1996



A PARTNERSHIP BETWEEN THE

United States Department of Agriculture

Forest Service

Intermountain Region

Ashley National Forest

United States Department of Interior

Bureau of Land Management

Vernal District



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 Reserve

Drive Through the Ages

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ONLY YOU

Northeastern Utah, much of which is administered by the Bureau of Land Management, offers a wealth of natural resources. This wildlife includes timber, water, forage, minerals, and recreational opportunities. These resources are managed under principles of multiple use. The objective of multiple use management on public lands is to obtain the optimum combination of uses and services for the benefit of the American people.
 The U.S. Forest Service administers nearly all of the lands at higher elevations in the Uinta Mountains. The beauty of the Ashley National Forest stretches from towering, rugged peaks reflected in crystal waters of numerous lakes to sagebrush bunch lands and the Flaming Gorge National Recreation Area.
 Most of the land at lower elevations is under the jurisdiction of the Bureau of Land Management. Between the Bookcliff Mountains and the Three-Corners area of Utah, Wyoming and Colorado, lie the meandering Green River and the deep gorges and faults which form the unique expanse of the Vernal District. The three million acres of public land administered by these conservation and land management agencies in this area offer a wide variety of opportunities to the outdoor enthusiast ranging from mountain climbing above timberline to rabbit hunting on the deserts.

Welcome to
 Northeastern
 Utah



History of the Uinta Mountains

The Uinta Mountains, which are part of the Rocky Mountains, are one of the few east-west ranges in the western hemisphere. Geologic formations making up the Uinta range are composed of rock and soil deposited by ancient rivers, glaciers, seas or windstorms.

The Uintas were formed 70 million years ago by a massive geologic upheaval which faulted and "bent" the overlying rock layers from a horizontal position into an elongated dome shape. Since then, the top of the mountain has been removed by erosion, exposing the edges of the folded layers. This is the reason you can pass through so much geologic history in so short a distance, a unique geologic exposure unequalled along a major highway anywhere else in the United States.

The Flaming Gorge-Uintas Scenic Byway (US-191/124) takes you through this panorama of geologic history. As you proceed north from Vernal toward the Flaming Gorge National Recreation Area, you will drive 30 miles across edges of exposed rock layers that are progressively older. The "core" of the Uinta Mountains, exposed near Flaming Gorge, is a billion years old.

Stewardship of Your Public Lands

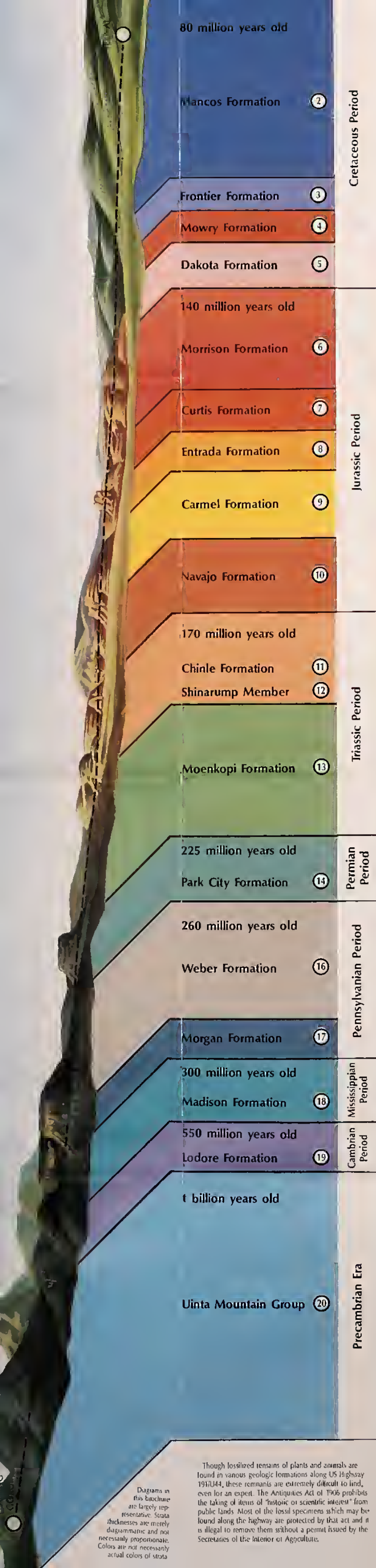
means concern for ecological relationships. You can show your concern by staying on roads when driving in fragile lands; enjoying the land quietly so that wildlife and other visitors are not disturbed; attending your campfire until it is fully out; leaving trees, wildflowers and other live vegetation undisturbed; and packing out your litter. As a steward of the past, you can help protect our cultural heritage by taking nothing but photographs.

Safety

When stopping along highways, park well off the travel way and be cautious when walking across highways.

Drive Through the Ages Tour

LEGEND:
 ① GEOLOGY SIGN LOCATION
 GEOLOGIC KIOSK
 START TOUR



- 1 Mancos Formation**
This is the youngest rock exposed north of Vernal along US Highway 191. It is generally composed of clays that settled to the bottom of a sea which covered the area. Many creatures which lived in that sea are preserved as fossils in this "ancient mud."
- 2 Frontier Formation**
For millions of years, tropical plants were buried beneath tons of sediment deposited near a river delta. Under heavy pressure, decomposition without air took place and formed coal. Prehistoric "cannonballs" up to ten feet in diameter can be seen in the area around the geologic marker sign. These round limestone rocks were formed like other concretions: by the addition of calcite, layer upon layer, around a center which is frequently a fossil.
- 3 Mowry Formation**
This layer is composed of shale (hardened clay and volcanic ash) left 100 million years ago by one of the ancient seas that covered this area. Of the fish that lived in the sea, only fossilized scales and bones remain.
- 4 Dakota Formation**
Almost 110 million years ago, streams flowed into an ocean in this area. Like streams today, they transported rocks and soil and provided water for trees and plants to grow. The Dakota formation is composed of soil and rocks deposited in those streams and along the beaches. Trees and plants are now petrified and preserved within the deposit.
- 5 Morrison Formation**
145 million years ago, this area was a low-lying plain with streams and lakes, where dinosaurs, crocodiles and turtles lived. During millions of years those animals became extinct, with only "bones" left as a record of their existence. The various rainbow-colored layers within the Morrison Formation (red, maroon, purple, siltite and green) consist of different types of clay, shale and sandstone.
- 6 Curtis Formation**
This sandstone shale and limestone formation was deposited by an ancient sea. Evidences of the sea can still be seen in the form of mud cracks and ripple marks. An abundant animal in that sea was a squid-like creature called the Belemnite. All that remains of the animal are petrified skeletons which look like cigar butts. Other creatures included various types of shellfish and two swimming reptiles, one that looked like a dolphin and the other like a large swimming lizard.
- 7 Entrada Formation**
At the time the Entrada Formation stratum was laid down, this region was a desolate land, and too harsh for plants or animals to survive. The layer was deposited by windstorms about 150 million years ago.
- 8 Carmel Formation**
Footprints along a beach were left by dinosaurs 155 million years ago. When a dinosaur walked over soft ground, an impression was left. That footprint then filled with a plaster-like substance which hardened to produce a cast of the print. Locally this formation also contains gypsum, an evaporite formed from a drying ocean.
- 9 Navajo Formation**
At the time this layer was deposited, the area was covered by large sand dunes. Over millions of years, the sand was cemented together by silica or lime, giving it a layered appearance. Among these sand dunes are deposits formed from a desert oasis. Footprints of dinosaurs are found on the surface of these flat-lying sands at Red Fleet Reservoir.
- 10 Chinle Formation**
Mud pebbles, mud cracks and ripple marks show that this layer was deposited by lakes and streams. Those lakes and low lands were home for a crocodile-like reptile called the Phytosaur. Only the teeth of that reptile have been found in the Chinle Formation. Coeloids, which are hollow stones that have the cavities lined usually with calcite or quartz crystals, are also found in this stratum.
- 11 Shinarump Member**
At the time this layer was deposited, the area had pine trees that grew up to three feet in diameter and 40 feet tall. The same evergreen tree—the Araucaria—grows in Australia and South America today. The Shinarump conglomerate is the same layer in which large amounts of uranium have been found in southern Utah.
- 12 Moenkopi Formation**
A creature called the "hand reptile," because its footprints resembled a hand in appearance, inhabited this land when the Moenkopi formation was deposited. Tracks left by that reptile 200 million years ago are found today in this stratum.
- 13 Park City Formation**
From the Permian geologic period, the Park City Formation in this area contains large deposits of phosphate, which was formed by the decomposition of marine animals which lived here. The open-pit mining operation behind the geologic marker produces about 250,000 tons of concentrates annually. The phosphate is shipped elsewhere to be processed for use as commercial fertilizer. Like other geologic strata, the Park City formation covers a large area. The rim of the Grand Canyon and this vicinity were both deposited by a sea that covered the entire region.
(2.4 miles north from the Park City Formation geologic marker is the Windy Point turn-out, which affords an outstanding view of Ashley Valley. A geologic interpretive sign is located there.)
- 14 Weber Formation**
Commercial oil fields in Ashley Valley yield petroleum from the Weber Formation which normally is 4,000 to 6,000 feet below the earth's surface. This stratum is about 1,000 feet thick. Sand grains in the stratum are poorly cemented and the formation therefore is easily eroded by water. A result is the deep, steep-walled gorges in this area.
- 15 Morgan Formation**
In this layer are remains from a sea which supported many types of life, large coral reefs, sponges, horseshell plants and sea urchins flourished. Other sea life included the brachiopod which was a small animal similar to a clam with two arm-like parts on each side of its mouth.
- 16 Madison Formation**
This limestone formation was deposited in one of the 12 seas that have covered this area at one time or another in the past millions of years. Various forms of primitive sea life crept, crawled or swam over this area 300 million years ago. A major unconformity underlies this formation, with the Ordovician, Silurian and Devonian Periods missing from the rock record.
- 17 Lodore Formation**
In the Cambrian geologic period a curious little creature called the trilobite scurried across the mud and sand bottom of a sea which flooded this area. Later the mud and sand became the trilobite's grave and preserved the fossilized shells and traces of that and other ancient marine animals.
- 18 Uinta Mountain Group**
This stratum from the Precambrian geologic period of a billion years ago is more than three miles thick. The layer contains few signs of primitive life. If you were to go back to Vernal and dig a hole down to this same geologic level, that hole would be two and one-half miles deep. Because the strata that were deposited horizontally later were uplifted to an almost vertical position—and the mountain top eroded away—it is possible for you to "travel toward the center of the earth" by driving 30 miles over the earth's surface!

Diagrams in this brochure are largely representative. Strata thicknesses are merely diagrammatic and not necessarily proportionate. Colors are not necessarily actual colors of strata.

Though fossilized remains of plants and animals are found in various geologic formations along US Highway 191/44, these remains are extremely difficult to find, even for an expert. The Antiquities Act of 1906 prohibits the taking of items of "historic or scientific interest" from public lands. Most of the fossil specimens which may be found along the highway are protected by that act and it is illegal to remove them without a permit issued by the Secretary of the Interior or Agriculture.

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